Observing strategy (NPOI)

- Theory (done)
- Apparatus (DM talk)
- Observing strategy
  - Astrophysical problem
  - Target selection
  - Observing strategy
  - Reduction and analysis
  - Interpretation

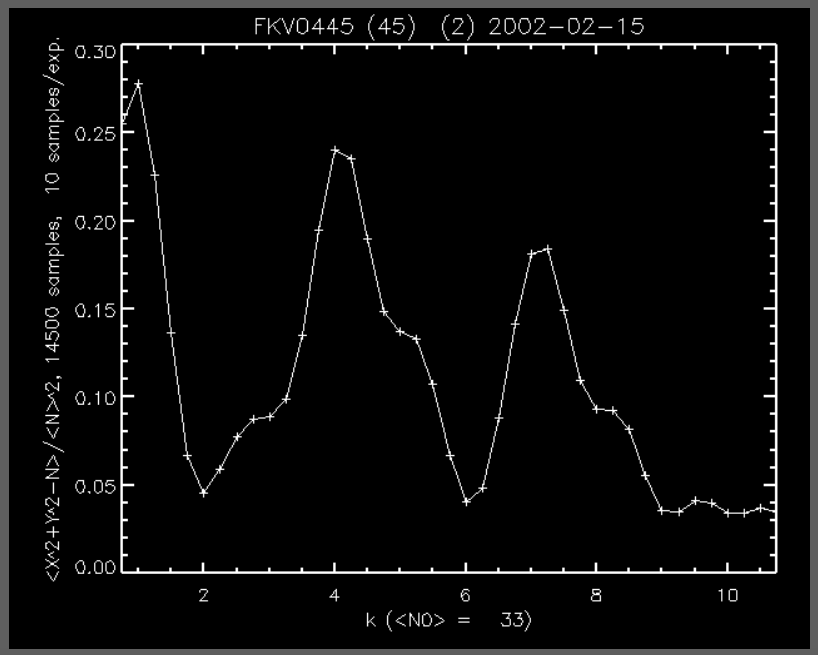
NPOI 6-Station Array Data Reduction

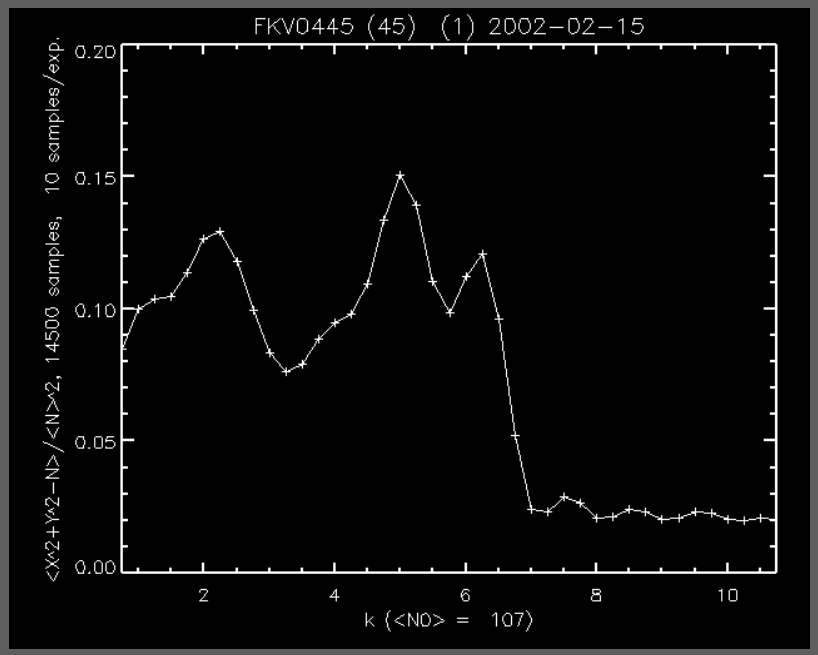
Aerial view of NPOI site on Anderson Mesa

NPOI Baseline Layout

K=1 (WN), 2 (E2E), 3 (NE2), 4 (WE2), 5 (NE), 6 (WE)

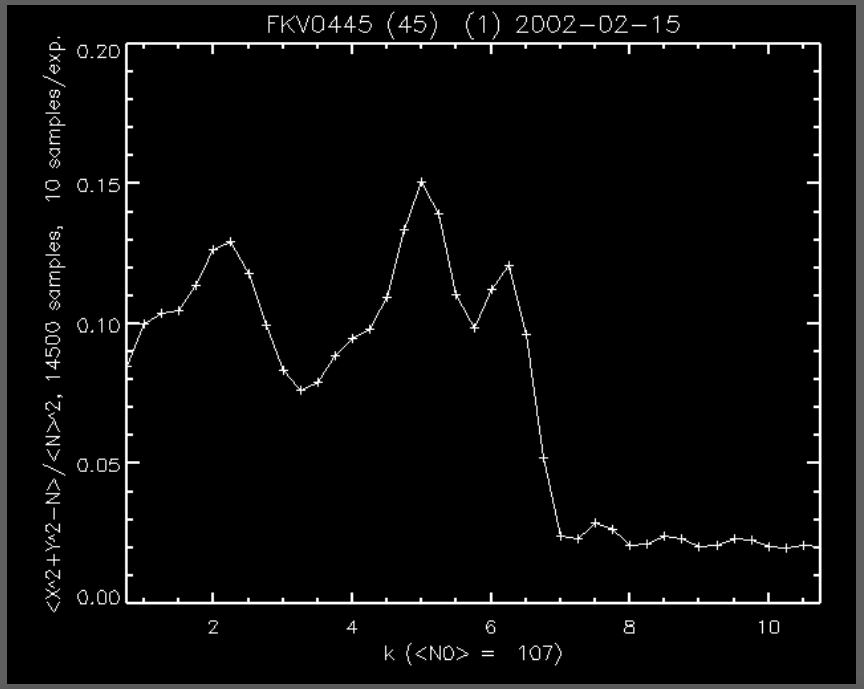
K=1 (CW), 3 (E2W7), 4 (WE2), 5 (CE2), 7 (WW7),
8 (E2W7)

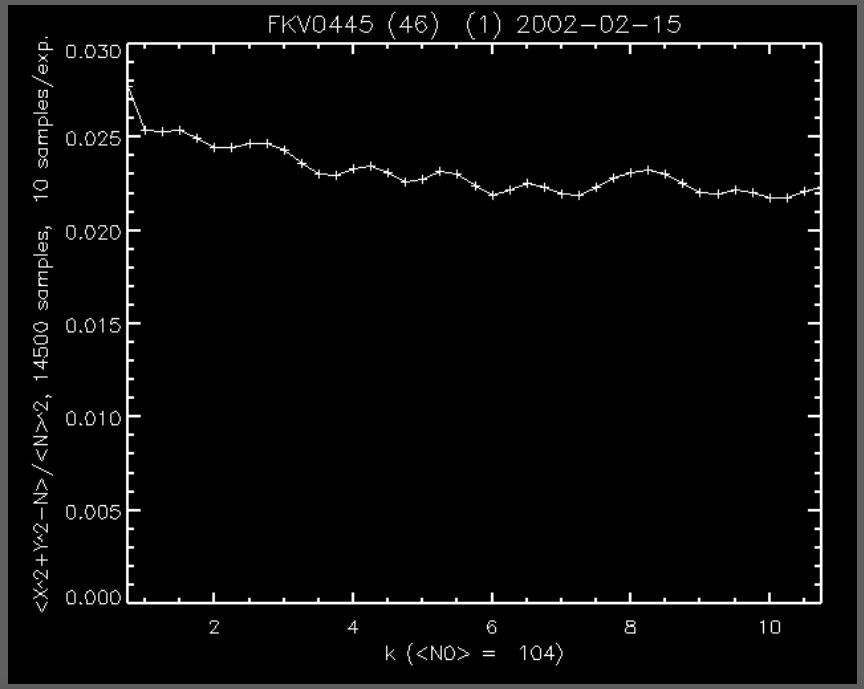




Visibility Bias

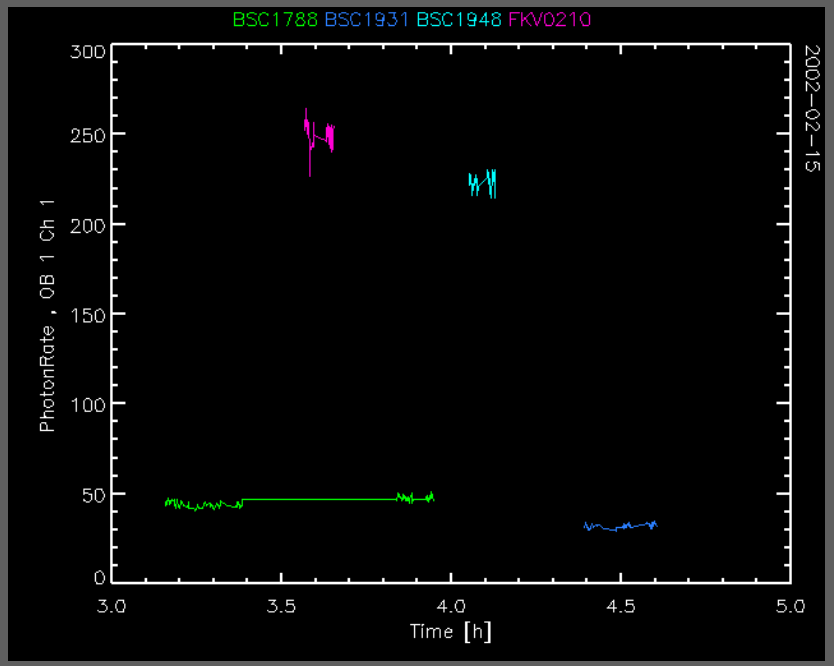
The (squared) visibility amplitude measured when signal is incoherent. In the case of Poisson noise, the bias is equal to N.

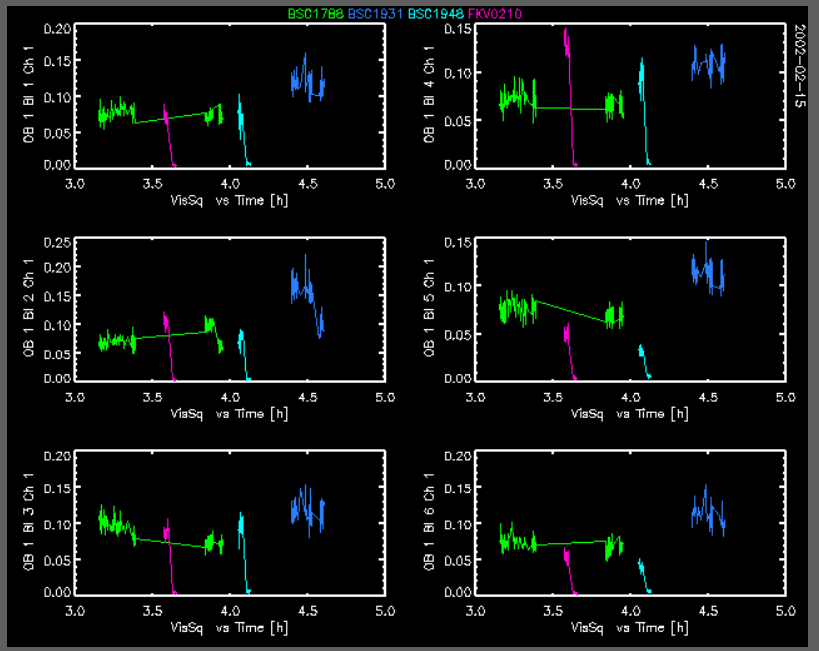




Incoherent Scans

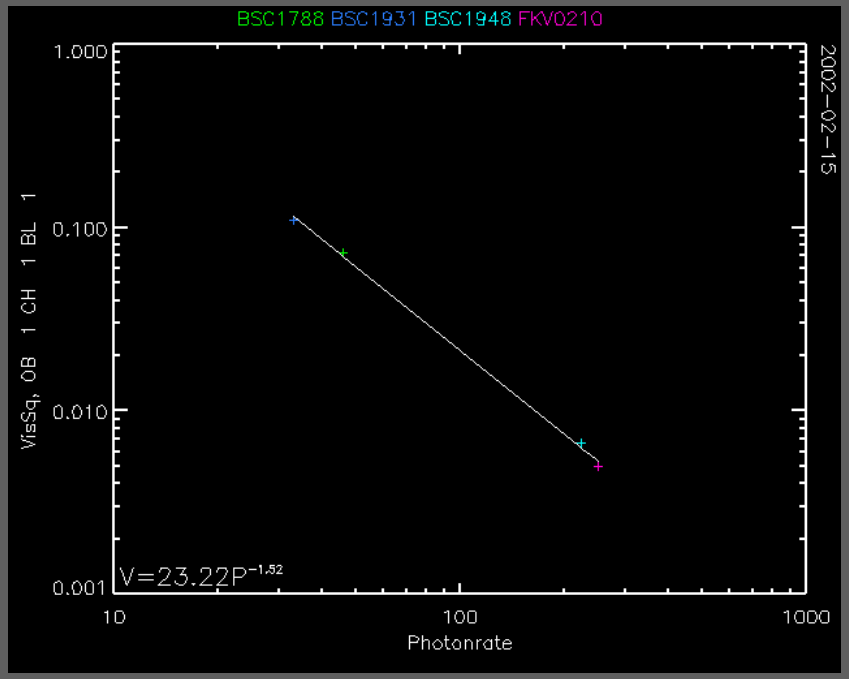
Like background scans, incoherent scans are paired with coherent scans.

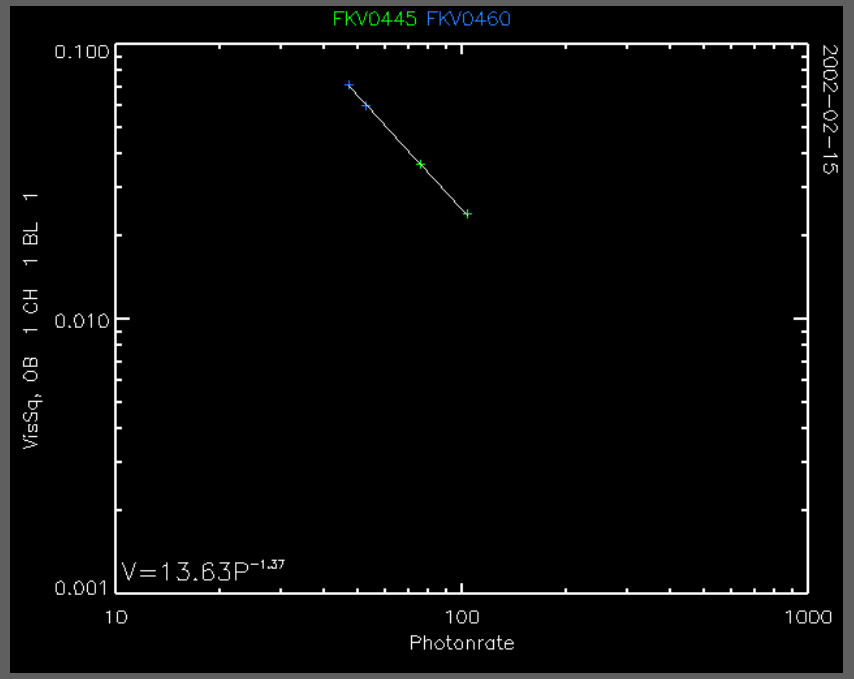




Bias Computation

Fit a straight line in a log-log plot of (squared) visibility amplitude versus photon rate.





Crosstalk

WE2 @ k=4

Three scans:

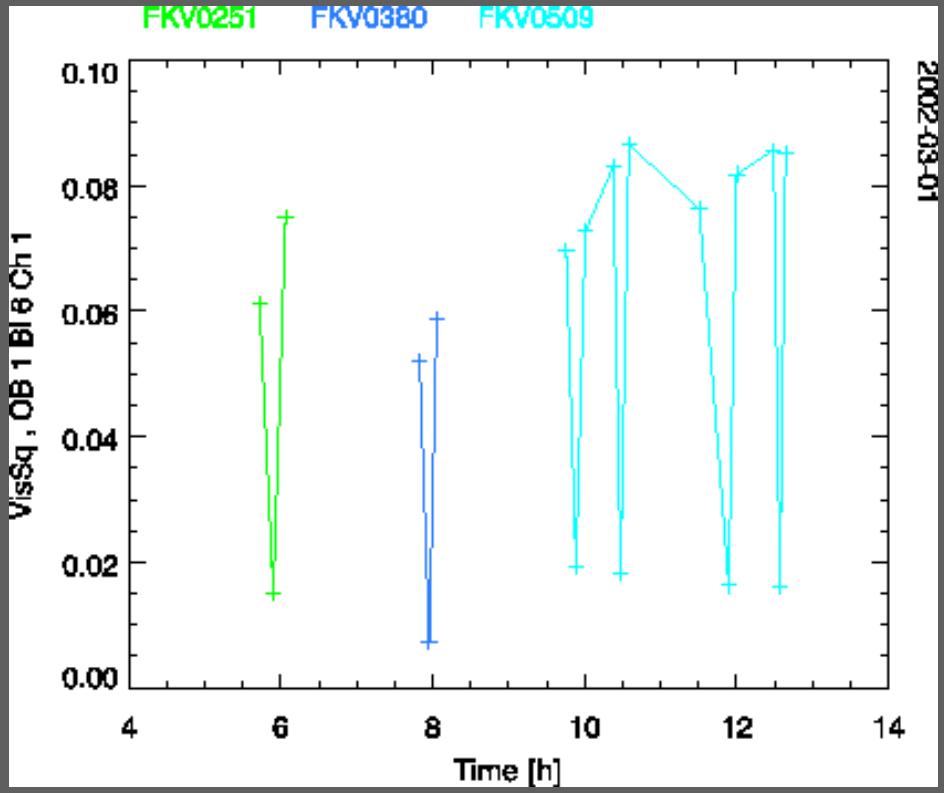
-this baseline alone

-NW (K=1)

-all tracking (E2N @ k=3)

Light from all three

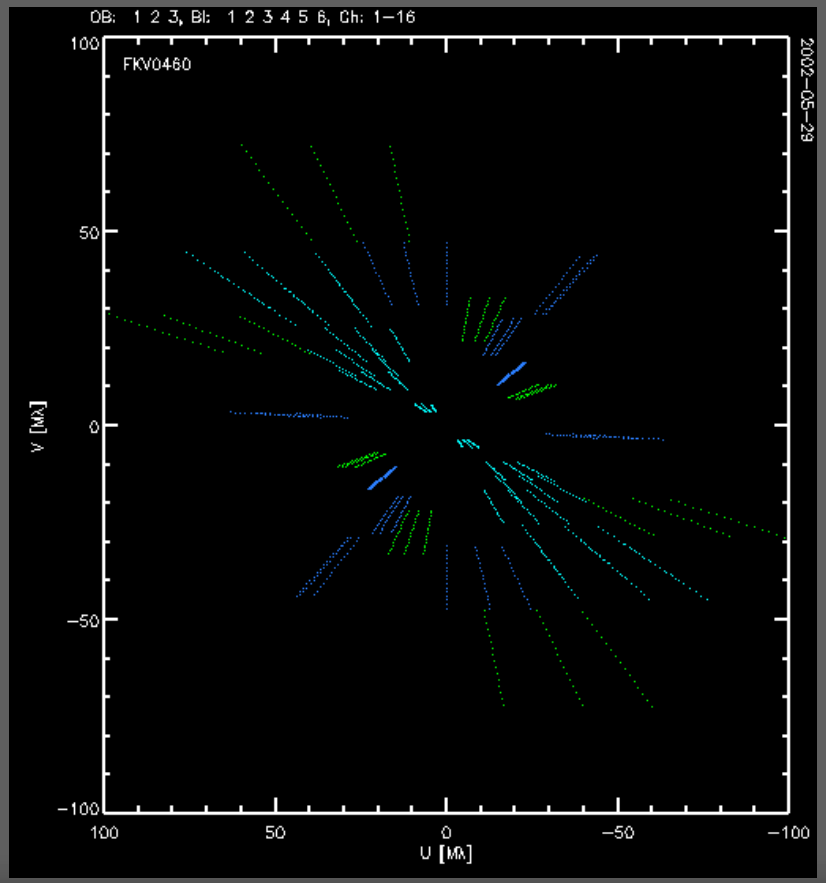
Stations on the detector

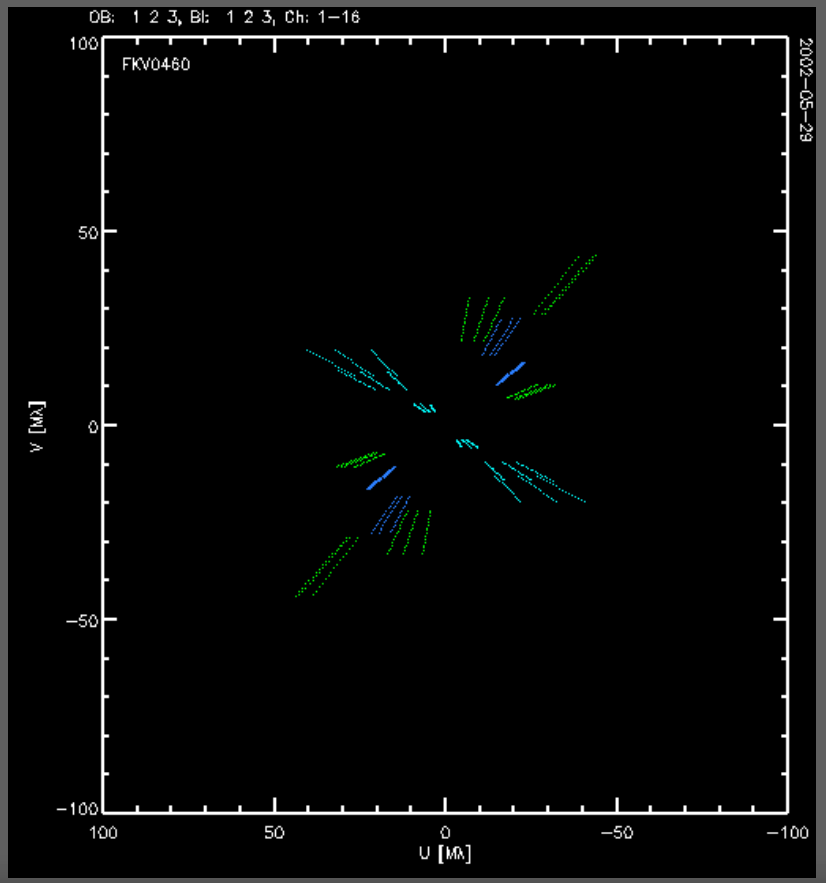


Configurations

6-Station array: E2, C, E, W, W7, N

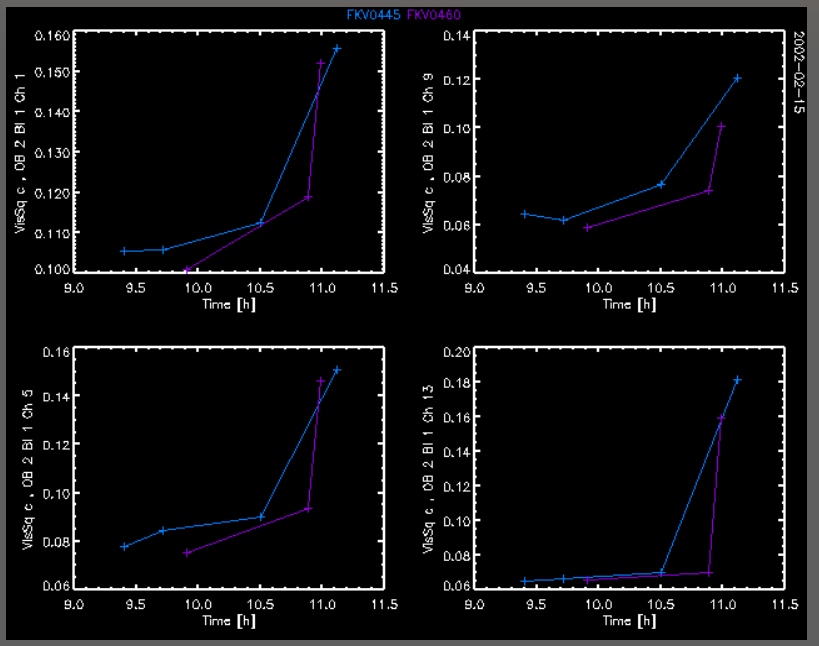
5-station array without W7.





Photometry

The visibility amplitudes have to be normalized to the same coherent photon rates on the detector.



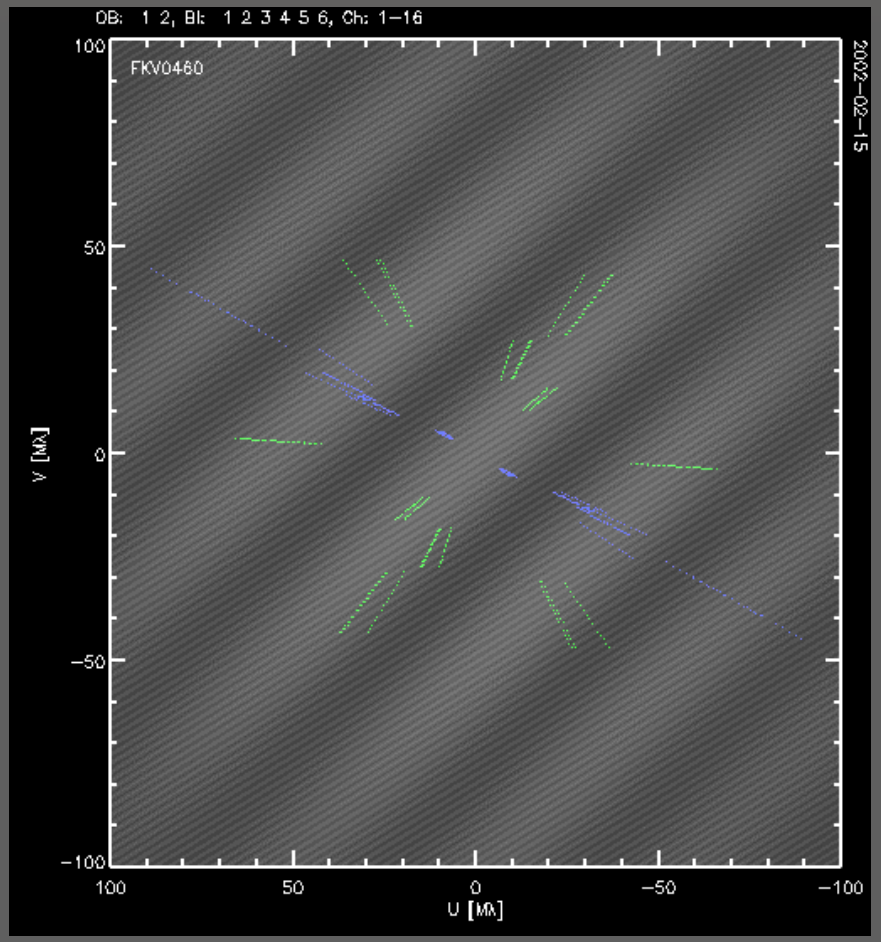
File Sessions Settings Help

```
OYSTER>
( 42) FKV0445 (09h 23m 53.0s, 111111, 1) ( 52) FKV0460 (10h 40m  3.0s, 111111, 1)
( 43) FKV0445 (09h 28m 22.5s, 111111, 0) ( 53) FKV0460 (10h 53m 20.6s, 111111, 1)
( 44) FKV0445 (09h 42m 48.7s, 111111, 1) ( 54) FKV0460 (10h 59m 24.1s, 111101, 1)
( 45) FKV0460 (09h 54m 11.1s, 111111, 1) ( 55) FKV0460 (11h 03m  6.6s, 111101, 0)
( 46) FKV0460 (09h 59m 50.9s, 111111, 0) ( 56) FKV0445 (11h 06m 53.8s, 111101, 1)
( 51) FKV0445 (10h 30m 17.0s, 111111, 1) ( 57) FKV0445 (11h 10m  4.7s, 111101, 0)

OYSTER>
OYSTER>
OYSTER>
```

Observing

Select an array configuration suited to the spatial scales of your stellar system or stellar surface.

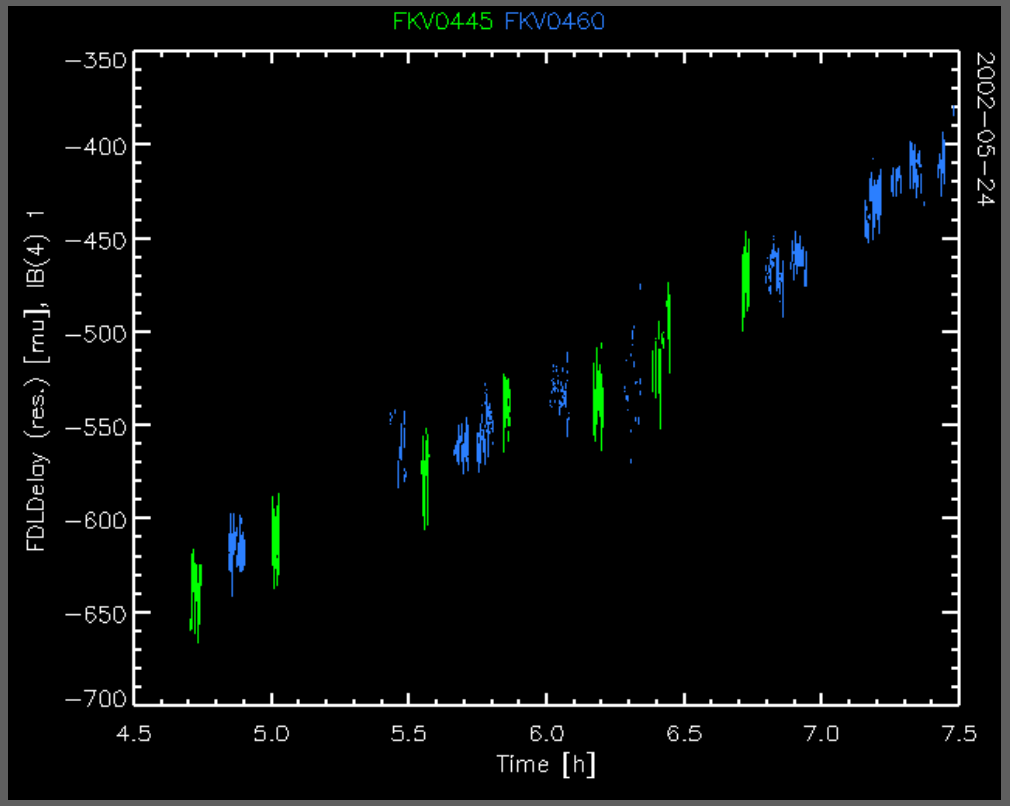


Editing data

Fringes are tracked on baselines to a reference station. Stations in fringe search mode have to be edited manually.

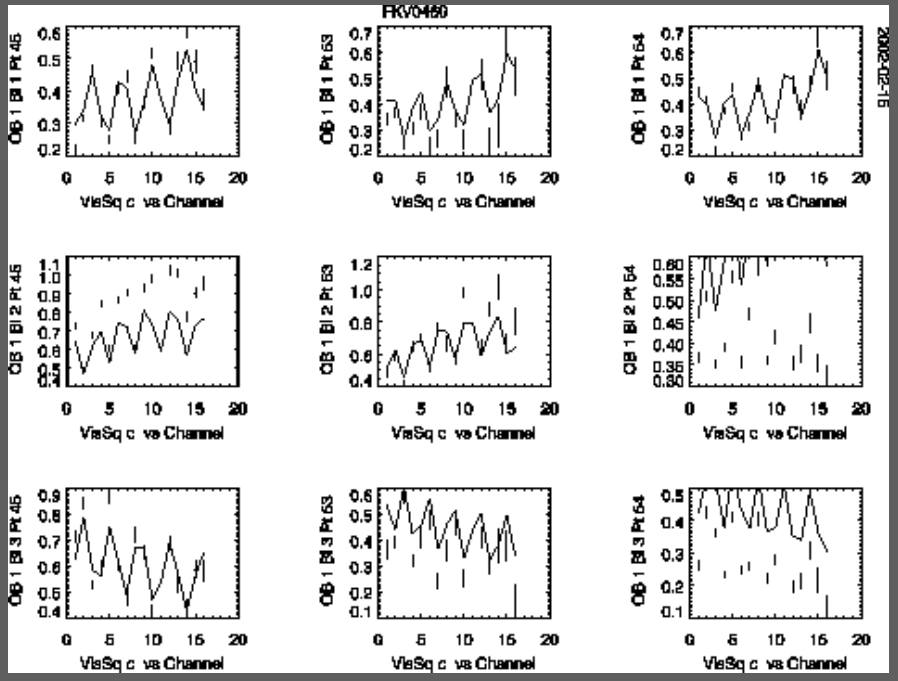
File

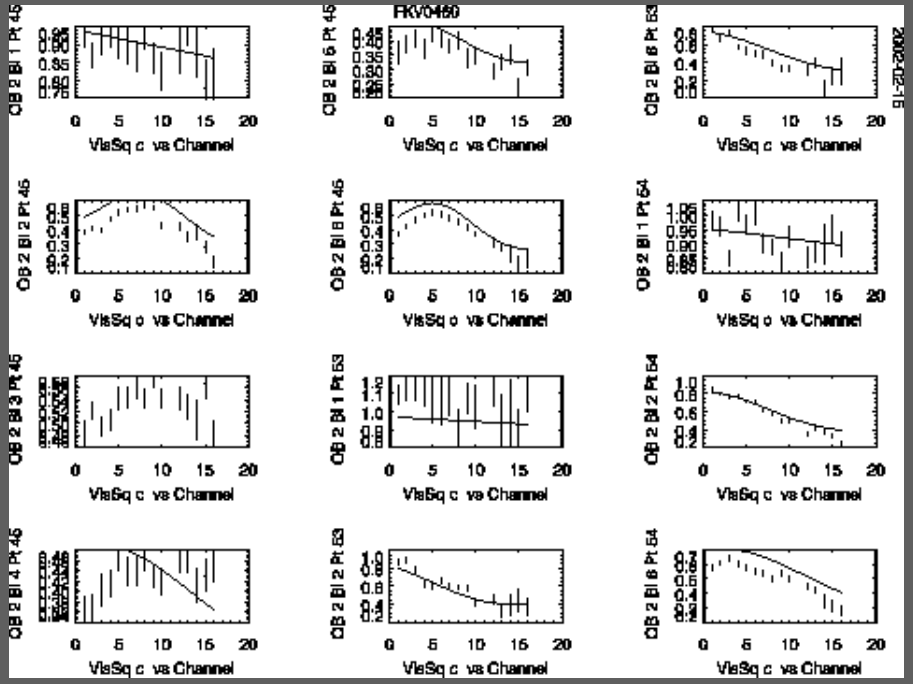
```
05:19:53 : now.  Seeing is more like B1 and 6-way fringe
05:20:13 : tracking isn't happening...
05:21:31 : not getting any 5-way data either.  It's jsut
05:21:48 : too intermittant, not a lose of any particular
05:22:23 : baseline.  The NAT flux is fairly level though.
05:24:44 : That was scan 7, starlog 7.
05:31:19 : *
05:39:39 : scan 9, only got 23 seconds of 4-way data,
05:39:56 : taking another scan but going to 3-way.  It's
05:42:29 : different combinations of baselines tracking at
05:42:46 : different times.
05:56:32 : *
05:56:35 : scan 12, starlog 12, got less than 20 seconds of
05:56:58 : 4-way data on FKV0460.  Again, taking another
05:57:11 : scan with lower way, 3.
06:16:54 : *
06:16:56 : scan 16, only got 22 seconds of 3-way on FKV0460.
06:29:29 : *
06:29:31 : scan 18, FKV0460, 3-way isn't really happening
06:29:55 : now either.  The AE-AW fringe is the only one
06:30:30 : I'm sure of and it is very intermittant - more
06:30:58 : not tracking than tracking.  Only recorded
06:33:45 : 2 seconds of 3-way.
06:38:43 : *
```



Modeling of visibilities

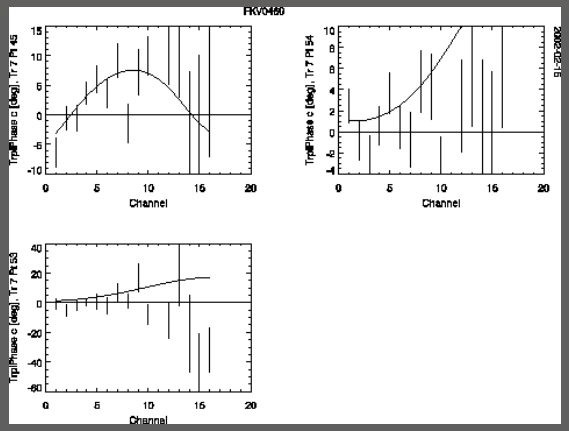
These data shown here are from the two spectrometers.





Modeling of closure phases

WE2-CE2-CW
(122)



E2E-WE-WE2
(111)

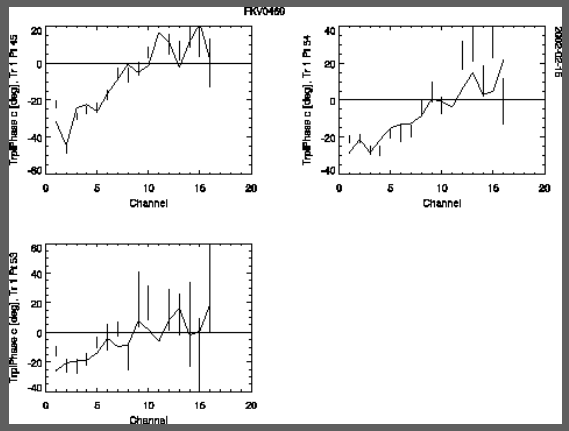
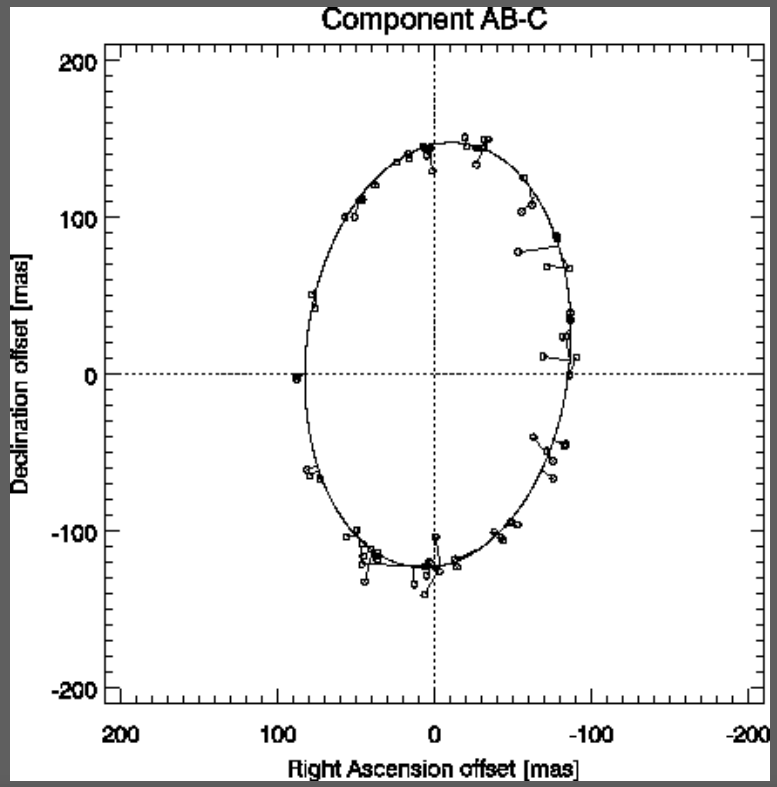
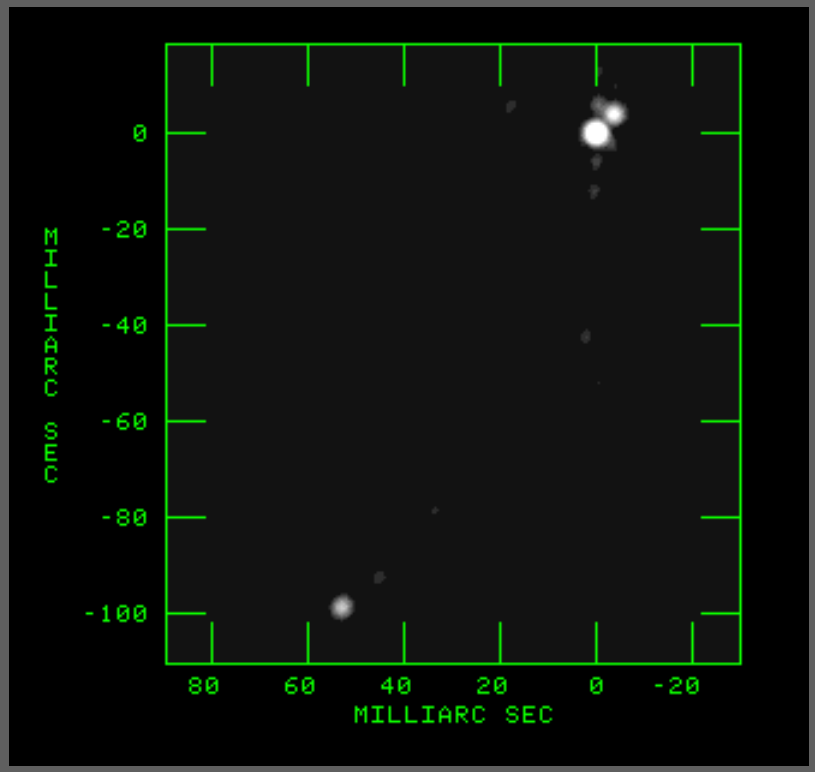


Image of Eta Virginis

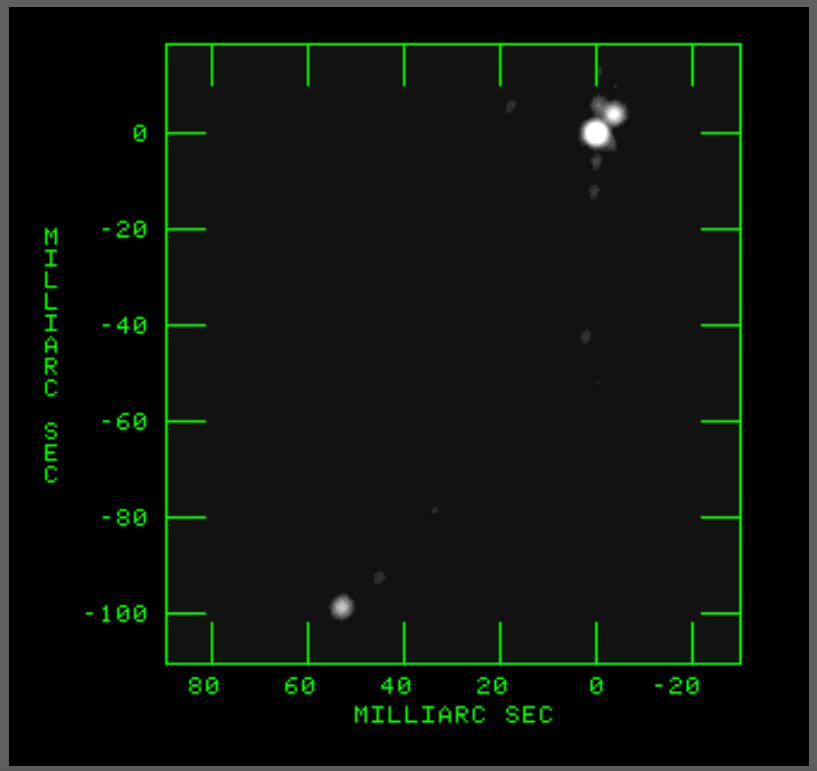
The orbit of the wide pair was observed with the speckle technique.

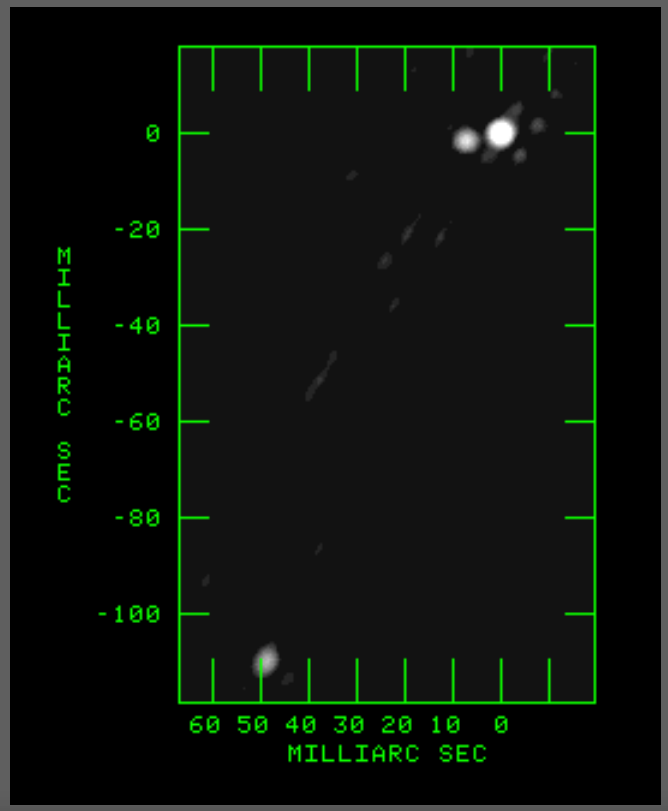




Orbital motion in Eta Vir

These images were produced from Feb 15 and May 19 data.





Orbits in Eta Vir

P = 4794 d

P = 71 d